



ARL is an Authority on Nutrition and the Science of Balancing Body Chemistry Through Hair Tissue Mineral Analysis!

Hair Tissue Mineral Analysis

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Mineral Patterns – Calcium/Magnesium Ratio

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Calcium/Magnesium Ratio

Normal And Abnormal Ratios

The ideal calcium/magnesium ratio in an unwashed sample of hair is about 6.67:1. Generally, a calcium/magnesium ratio lower than 4.5 or greater than 8.5 is indicative of a sensitivity to sugars and simple carbohydrates. Between 10:1 and 12:1, or 3:1 and 3.3:1 are considered low blood sugar ranges. Over 12:1 and less than 3:1 are considered a severe sugar and carbohydrate sensitivity range. Washing the hair at the laboratory can skew the calcium/magnesium ratio and render it less reliable.

Ratios greater than 10:1 or less than 3:1 also indicate a tendency for calcium precipitation in the tissues. This can cause bone spurs, arthritic changes, arterial calcification and calcium stone formation in the kidneys or gall bladder. Magnesium is required to keep calcium in solution. When the ratio is imbalanced, it may reflect a relative magnesium deficiency.

Highly imbalanced ratios - above 12:1 and less than 3:1 - often indicate emotional difficulties.

But I Don't Eat Carbohydrates

An imbalanced calcium/magnesium ratio usually indicates excessive carbohydrates in the diet. All foods contain carbohydrates. However, carbohydrate-rich foods are grains, pasta, bread, potatoes, beans, carrots, peas, corn, fruit, sweets and sugars such as fructose, dextrose, malt sweeteners, honey and maple syrup. At times, patients tell us they are not eating any of these foods, yet their calcium/magnesium ratio is unbalanced. There are several explanations.

Many people are not aware or truthful about the amount of carbohydrates they consume. Carbohydrates may be hidden in many foods, especially prepared and packaged foods. Many, items have added sugar, cornstarch, barley malt, flour, fructose and other starches or sugars. Also, remember the starchy vegetables - potatoes, carrots, beets, turnips, rutabaga, winter squash, corn, beans and peas, although they are superior to eating sugar because they contain more fiber, vitamins and minerals, one can still overeat on them. Fruits, fruit juices, wine, beer, mixed drinks and soft drinks may be very high in carbohydrates.

If you have thoroughly ruled out excessive dietary carbohydrates, consider these other causes for an unbalanced calcium/magnesium ratio.

Stress

Stress of any kind can affect the calcium/magnesium ratio. This is most likely due to its affect on the adrenal glands and glucose metabolism. Stress can increase blood sugar through the action of cortisol, leading to reduced sugar tolerance. Nutritional depletion from stress and sustained excessive cortisol and insulin secretion can cause increased insulin resistance.

Cortisol release increases osteoblastic activity (A cell that makes bone) that may lead to a higher tissue calcium level as calcium is released from the bones. Excessive calcium channel activity due to stress can cause a catabolic state, with increased cell death and release of magnesium from the cells.

An imbalanced calcium/magnesium ratio may also be secondary to an imbalanced sodium/potassium ratio. The latter is a blood sugar ratio related less to diet and more to the effects of stress on energy production.

The calcium/magnesium ratio and sodium/potassium ratio may correlate because of a direct relationship between calcium and sodium, both extracellular elements and between magnesium and potassium, both intracellular elements.

Also, sodium and magnesium tend to be antagonistic, as do calcium and potassium. That is, one rises when the other falls. Dr. Louis Kervan found that sodium-magnesium is a common transmutation, perhaps affected by adrenal gland activity. Dr. Paul Eck found the calcium/potassium ratio and sodium/magnesium ratio better indicators of glandular activity than simply mineral levels.

When both calcium/magnesium and sodium/potassium ratios are low, it is referred to as a double inversion. It can reflect a more severe sodium/potassium ratio inversion ratio, associated not only with carbohydrate intolerance, but also immune system weakness, protein catabolism, chronic emotional stress and adrenal exhaustion.

Similarly, if both calcium/magnesium and sodium/potassium ratios are elevated, the high calcium/magnesium ratio may reflect a more severely high sodium/potassium ratio pattern, associated with acute stress, inflammation and related symptoms.

Emotional Stress

Emotional stress, even positive stress, can affect the calcium/magnesium ratio. Perhaps it is because stress affects carbohydrate tolerance. Other factors may also contribute. For example, the "*calcium shell*" phenomenon is related to an excessively elevated calcium level. This has a numbing and protective effect in the face of stress. Usually the magnesium level also rises, but in some cases the calcium/magnesium ratio may also be elevated.

Copper toxicity, often related to stress, also initially affects the calcium level. Once again, the calcium/magnesium ratio is usually maintained, but may not be under some circumstances. Addressing emotional factors may be essential for balancing the calcium/magnesium ratio.

Zinc, Taurine and Vitamin B₆

Deficiencies of zinc, taurine and vitamin B₆ affect magnesium levels. These nutrients are synergistic with magnesium. High-carbohydrate diets deplete zinc and vitamin B₆ and often lack taurine, which is found only in meats.

Deficiencies of these nutrients may cause a magnesium loss or biounavailability. Recall that a high level of any nutrient element on a hair analysis often indicates biounavailability, or loss of the element into the hair tissue.

Most diets are also low in magnesium. This is made worse by drinking a lot of milk, taking calcium supplements that do not contain magnesium, or eating refined-food diets. While a calcium deficiency gets lots of press, magnesium deficiency also occurs commonly.

Toxic Metals and Contamination

Lead and other toxic metals in the body can skew a calcium/magnesium ratio. Lead displaces calcium from the bones. Cadmium can also displace calcium. Toxic metals may or may not be revealed on the hair analysis, as they may be sequestered deep in body tissues. If not revealed on the test, they will often show up on future tests as body chemistry improves provided the patient follows a scientific program designed to balance body chemistry.

Handling Imbalanced Calcium/Magnesium Ratio

Begin by reducing dietary carbohydrates, improving digestion and correcting the diet in accordance with the oxidation type. Supplementing with sufficient zinc, magnesium, vitamin B₆ and taurine are helpful, along with supplements indicated by other hair analysis patterns.

Reducing stress may be very important. Severe stress can inhibit or even override any dietary or supplement program. Any time the calcium/magnesium ratio is very imbalanced, emotional stress is likely and important to address.

If a double inversion is present (low calcium/magnesium and sodium/potassium ratios), or adrenal exhaustion is suspected, the first priority for correction is the sodium/potassium ratio. As this improves, often the calcium/magnesium ratio will improve as well. The two ratios may alternate in their improvement over a period of months.

If toxic metals are affecting the ratio, the diet and supplement program can help mobilize these from storage, at which time the ratio will often improve.

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